

A SURVEY AND ASSESSMENT OF THE RARE VASCULAR PLANTS OF THE IDAHO NATIONAL ENGINEERING LABORATORY SITE

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ABSTRACT.— A two-year study of the rare vascular plants of the Idaho National Engineering Laboratory generated new data on the abundance, distribution, and habitat features of eight taxa presently under review at either the federal or state level, or recently proposed for such review. *Astragalus ceramicus* Sheld. var. *apus* Barneby is common on the INEL and adjacent areas and will be recommended for removal from further consideration at the federal level and placed on Idaho's Federal Watch List. *Coryphanta missouriensis* (Sweet) Britt. & Rose is common throughout east central Idaho, but will be recommended for retention on the State Watch List. *Gymnosteris nudicaulis* (H. & A.) Greene and *Oxytheca dendroidea* Nutt. are also recommended for retention on the State Watch List. Four taxa not previously known to occur in Idaho or not known from the southeastern part of the state (*Astragalus gilviflorus* Sheld., *Astragalus kentrophyta* Gray var. *jessiae* (Peck) Barneby, *Gilia polycladon* Torr., and *Lesquerella kingii* S. Wats. var. *cobrensis* Roll. & Shaw) were encountered and evaluated with reference to current or potential threats, and are recommended for placement on Idaho's State Watch List.

Passage of the Endangered Species Act of 1973 and the subsequent reauthorizations have generated considerable interest in rare plant and animal taxa, especially among those federal agencies on whose lands these organisms occur. The multitude of questions from land managers concerning the status of rare plants, and the desire to know more about these unusual organisms, have resulted in the publication of numerous manuals generally summarizing data on a state-by-state basis (Henderson et al. 1977, Mozingo and Williams 1980, and others). Additionally, some federal agencies (e.g., U.S. Forest Service, BLM, U.S. Department of Energy) have contracted with botanists for surveys and assessments of the rare plants occurring on federal lands.

Although floristic studies have been accomplished on the U.S. Department of Energy Idaho National Engineering Laboratory (INEL) site (Atwood 1970, Jeppson and Holte 1978), they provided little information on the abundance and distribution of plant taxa inhabiting it, and additional studies would be necessary if accurate assessments of the rare plants were to be made. The U.S. Department of Energy, therefore, contracted with the University of Idaho for a survey and assessment of the rare vascular plants of the INEL.

Before any quantitative analysis of impacts on plants can be made, it is necessary to gather preliminary information on their abundance and distribution. Toward this major goal, field work on the INEL was initiated in the spring of 1981 with the following objectives: (1) document the abundance and distribution of all rare plant taxa occurring on the INEL, (2) assess subjectively current or potential threats to survival of the plants, and (3) make preliminary recommendations to the Department of Energy concerning the status and management of habitats supporting rare plant taxa.

STUDY AREA

The approximately one-half million acres of the INEL are located near the eastern end of the Snake River Plain in southeastern Idaho (Fig. 1). This is an area of lava flows and deep sand, with elevations ranging from 2004 m on East Butte to 1454 m in the Big Lost River Sinks. The vegetation is largely shrub-steppe, with *Artemisia tridentata* Nutt., *Chrysothamnus viscidiflorus* (Hook.) Nutt., *Agropyron spicatum* (Pursh) Scribn. & Smith, and *Poa secunda* Presl predominating, although woodlands of *Juniperus osteosperma* (Torr.) Little occur locally.

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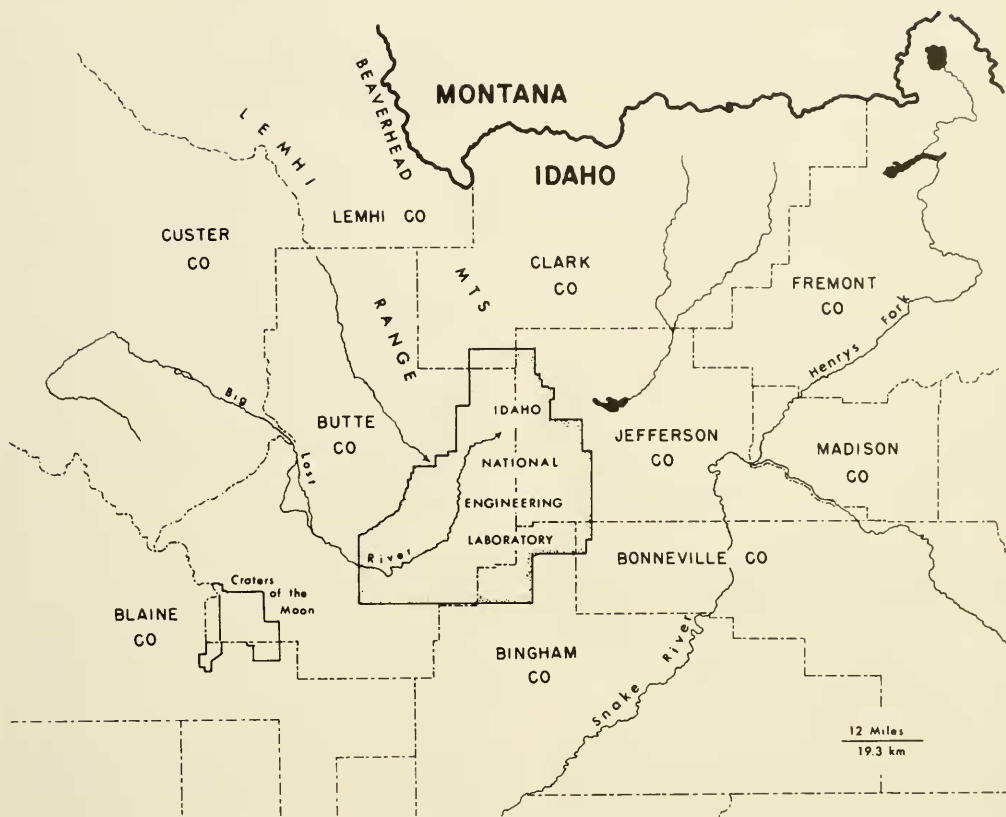


Fig. 1. Location of Idaho National Engineering Laboratory.

METHODS

Since many rare plant taxa are known to be highly restricted to particular habitats, concentrated searching in suitable habitats is likely to be the most productive. Toward this objective, a tentative list of rare plant taxa was compiled to include known distribution, habitat, and phenological data. This list was generated largely from *The Vascular Plant Species of Concern in Idaho* (Rare and Endangered Plants Technical Committee, Idaho Natural Areas Council [INAC], 1981) and supplemented with recent data supplied by the herbaria of the College of Idaho (CIC), University of Idaho (ID), and Idaho State University (IDS).

Likely habitats were identified and located with the use of USGS topographic maps, a vegetation map of the INEL (McBride et al. 1978), assistance from INEL personnel, and prior personal experience within the area.

These habitats were then searched intensively in two subsequent field seasons.

Upon encountering a species of concern, a subjective evaluation was made of population size and condition (including reproductive success), current or potential threats under existing management, and details of the habitat including associated species. Voucher specimens are deposited at ID, IDS, and the herbarium of the Radiological and Environmental Sciences Laboratory on the INEL.

RESULTS AND DISCUSSION

Four taxa from the tentative working list were encountered during the study, one of which is currently a candidate for federal review, and three are of state concern. No plant taxa currently established as either endangered or threatened at the federal or state levels were encountered on the INEL. Additional taxa not previously known from Idaho

or which represented significant range extensions within Idaho, were also encountered. These taxa were evaluated in the same manner as taxa from the working list.

Candidate Taxa for Federal Review

Astragalus ceramicus Sheld. var. *apus* Barneby (FABACEAE).—Previously known as an inhabitant of dunes and other sandy places (Hitchcock et al. 1961, Barneby 1964), this taxon is endemic to the eastern end of the Snake River Plain. It was generally considered to be rare by members of the Rare and Endangered Plants Technical Committee, INAC (1981), although it was reported to be a co-dominant in sandy areas near the north end of the INEL (Anderson et al. 1978). This taxon is limited primarily to areas of moderate to deep sand and in communities with *Artemisia tridentata* ssp. *tridentata*, *Chrysothamnus viscidiflorus*, *Stipa comata* Trin. & Rupr., and *Oryzopsis hymenoides* (R. & S.) Ricker predominating.

Over 30 populations, each with numerous individuals, were encountered on the INEL during our study. Additional populations were also encountered in similar habitats adjacent to the INEL and in other areas of the eastern Snake River Plain.

Reproductive success appears to be moderate, with perhaps four to five legumes produced per aerial stem, and some seedlings were observed each season. Vegetative growth, however, through the production of extensive rhizomes, appears to be vigorous.

Nearly all populations examined are subjected to grazing by both cattle and sheep, although without definitive studies the impact of this activity on the populations remains largely unknown.

The apparent reproductive success, even with grazing, and the numerous populations supporting many thousands of individuals now known throughout the eastern Snake River Plain probably do not justify its status as a candidate for federal review. We have suggested instead that it be considered for placement on the state list of endemics or near endemics that do not appear to be in jeopardy, Idaho's Federal Watch List.

Idaho State Watch List Taxa

Astragalus gilviflorus Sheld. (FABACEAE).—Prior to its recent discovery in Idaho in 1981 by Goodrich (Goodrich et al. 1983), this species was known only as far west as Madison County, Montana. A single population is now known from a limestone ridge on the extreme southern end of the Beaverhead Mountains at Reno Point along the northeast border of the INEL. At this site there is virtually no soil development and the approximately 100 scattered plants are rooted in cracks in the bedrock within an open community of *Artemisia arbuscula* Nutt. var. *nova* (A. Nels.) Cronq., *A. tridentata* ssp. *wyomingensis* Beetle, *Poa secunda*, and *Petrophytum caespitosum* (Nutt.) Rydb. Close associates here include *Tanacetum nuttallii* T. & G., *Hymenopappus filifolius* Hook. var. *idahoensis* Turner, and *Penstemon aridus* Rydb.

Although this area is open to grazing, the rocky nature of the habitat and the extremely compact habit of *Astragalus gilviflorus* precludes any significant impact from grazing animals.

We have recommended to the Rare and Endangered Plants Technical Committee, INAC, that this taxon be placed on the State Watch List for Idaho, and suggest that additional similar habitats within this area be searched. Although its habit is distinctive, the plants can be easily overlooked.

Astragalus kentrophyta Gray var. *jessiae* (Peck) Barneby (FABACEAE).—This variety was reported to have a bimodal distribution with an eastern center in southwestern Wyoming and a western component in southwestern Idaho and adjacent Oregon (Barneby 1964). The variety was discovered on the INEL during the course of our study and was reported as a significant addition to its known range (Cholewa and Henderson 1983).

Only three small populations are now known from the eastern Snake River Plain, all within the INEL. The habitats are characterized by deep gravelly sand derived from highly erodible silicic volcanic deposits at the southern end of the Lemhi Range. The community here has been characterized as a *Juniperus osteosperma*/*Artemisia tridentata*/*Agropyron spicatum* vegetation type (McBride et al. 1978), but the sites supporting *Astragalus kentrophyta* var. *jessiae* are

distinctive in lacking the *Artemisia*. Associated species include *Eriogonum ovalifolium* Nutt., *Arenaria franklinii* Dougl., and *Aristida purpurea* Nutt. var. *longiseta* (Steudel) Vasey.

It is clear from additional weedy species present and the obvious evidence of erosion that disturbance is a significant factor of this habitat. It is not clear, however, what influence the rather heavy grazing in the past has had on this taxon. For these reasons we have recommended placement of this taxon on the State Watch List for Idaho.

Coryphantha missouriensis (Sweet) Britt. & Rose (CACTACEAE).— Within the INEL this species appears to be restricted to gravelly flats and rocky ridges along the northern boundary in communities of *Artemisia tridentata* ssp. *wyomingensis* or *A. arbuscula* var. *nova*, both with *Poa secunda* as an important grass associate. Elsewhere in east central Idaho *Coryphantha missouriensis* is abundant.

No present threats to this species are apparent, although the possibility of future exploitation by cactus hunters prompted its placement on the State Watch List for Idaho.

Gilia polycladon Torr. (POLEMONIACEAE).— A member of the western Great Basin flora, its distribution in Idaho has been described only as "the sagebrush zones of s. w. Idaho" (Davis 1952), with no further data on specific locations. Its discovery on the INEL represents an extension to eastern Idaho (Cholewa and Henderson 1983).

Only a few locations are known for this taxon, on the INEL and on National Forest land to the northwest; all are on rocky slopes of volcanic or limestone origin. The communities are dominated by *Artemisia arbuscula* var. *nova* or *Elymus ambiguus* Vasey & Scribn. Close associates vary considerably among the areas but often include such taxa as *Langloisia setosissima* (T. & G.) Greene ssp. *punctata* (Cov.) Timbrook, *Lappula redowskii* (Hornem.) Greene, *Lupinus pusillus* Pursh, and *Cymopterus glaucus* Nutt.

Although the populations are located within areas open to livestock, the dry, rocky slopes probably prevent excessive grazing. We have recommended placement on Idaho's State Watch List until more data are available.

Lesquerella kingii S. Wats. var. *cobrensis* Roll. & Shaw (BRASSICACEAE).— This species is also a member of the Great Basin flora and was not known to occur in Idaho prior to our study. The var. *cobrensis*, formerly known only from the Pequop Range of Elko County, Nevada (Rollins and Shaw 1973), was discovered in the south central portion of the INEL (Cholewa and Henderson 1983). Habitats of the few Idaho populations are characterized by recent volcanics with extremely shallow soil. These open habitats are dominated by *Artemisia tridentata* ssp. *wyomingensis*, *Chrysothamnus viscidiflorus*, *Gutierrezia sarothrae* (Pursh) Britt. & Rusby, and *Poa secunda*, with no apparent constant associates.

Although occurring in an area open to grazing, cattle may be excluded by the rocky nature of the habitat, but the full impact of livestock is presently unknown. Our recommendations, therefore, were placement on the State Watch List for Idaho and to search for additional populations.

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